ENGINEERING EVALUATION REPORT
SHELL OIL PRODUCTS
PLANT NO. 11
APPLICATION NO. 14858

INTRODUCTION

This application is to bank Interchangeable Emission Reduction Credits (IERCs), in accordance with District Regulation 2, Rule 9, from the sources listed below at the Shell Martinez Refinery in Martinez, CA.

S-1507	CO Boiler #1
S-1509	CO Boiler #2
S-1512	CO Boiler #3

The emission reductions are the result of combustion modifications to CO Boilers No. 1, No. 2 and No. 3 that occurred on June 8, 1999, April 29, 1999, and October 28, 1998, respectively. Shell has already banked IERCs from these sources for the initial credit generation periods (CGP_1) immediately following the combustion modifications to each source. IERCs from CO Boilers 1 and 2 were banked under application numbers 439, 1820, 6979 and 10368. IERCs from CO Boiler 3 were banked under application numbers 27765, 1820, 6979 and 10368.

This application is to bank IERCs from all three CO Boilers for the following credit generation periods:

April 1, 2004 through June 30, 2004 (91 days); and
July 1, 2004 through June 30, 2005 (365 days)

IERCs for this application are calculated using the same baseline periods that were used in the previous IERC banking applications.

IERC CALCULATIONS

The procedure for calculating IERCs is described in Regulation 2, Rule 9, Sections 602 and 603. The IERC calculations to follow are based on daily NOx CEM concentrations, NOx emissions and steam production rates provided by Shell. Baseline data used in this application is the same data used in previous IERC applications from Shell. The data for each CGP was provided by Shell in this banking application. District staff audited this data by comparing it with data previously submitted as part of monthly emission reports for the CO Boilers.

Determine Baseline Period:
The baseline periods were already determined in the original IERC banking applications for the CO Boilers. The baseline periods and credit generation periods (CGPs) for the CO Boilers are summarized in Table 1. ***The credit generation periods for this current IERC banking application are highlighted in bold italics print.***

Table 1 – CO Boiler Baselines and Credit Generation Periods

	COB 1	COB 2	COB 3
Baseline	6/8/94 – 6/7/99	4/29/94 – 4/28/99	11/7/93 – 11/6/98
CGP_1	6/8/99 – 9/26/99	4/29/99 – 9/26/99	11/7/98 – 4/30/99
CGP_2	9/27/99 – 8/27/00	9/27/99 – 8/27/00	5/1/99 – 4/30/00
CGP_3	8/28/00 – 6/30/01	8/28/00 – 6/30/01	5/1/00 – 8/27/00
CGP_4	7/1/01 – 6/30/02	7/1/01 – 6/30/02	8/28/00 – 6/30/01
CGP_5	7/1/02 – 6/30/03	7/1/02 – 6/30/03	7/1/01 – 6/30/02
CGP_6	7/1/03 – 3/31/04	7/1/03 – 3/31/04	7/1/02 – 6/30/03
CGP_7	***4/1/04 – 6/30/04***	***4/1/04 – 6/30/04***	7/1/03 – 3/31/04
CGP_8	***7/1/04 – 6/30/05***	***7/1/04 – 6/30/05***	***4/1/04 – 6/30/04***
CGP_9	NA	NA	***7/1/04 – 6/30/05***

Per Regulation 2, Rule 9, Section 602 (Reg. 2-9-602), the baseline period for a source is the 5-year period immediately preceding the initial credit generation period. The initial credit generation period is determined by the completion date of the *first* IERC banking application. IERC banking applications 439 (CO Boilers 1 and 2) and 27765 (CO Boiler 3) were deemed complete on October 20, 1999, and September 3, 1999, respectively. Per Reg. 2-9-204, the initial credit generation period "shall not be more than 30 months prior to the submittal of the first complete IERC banking application for a particular emission reduction activity". The baseline and initial credit generation periods in Table 1 satisfy the requirements of Section 2-9-204.

Baseline Information:

The original baseline data is summarized in Table 2. This is the same baseline data that was used for all previous IERC banking applications for the CO Boilers.

Table 2 – Original IERC 5-Year Baseline Data

		CO Boiler 1 6/8/94 –6/7/99	CO Boiler 2 4/29/94 – 4/28/99	CO Boiler 3 11/7/93 – 1/6/98
Ave. NOx Emissions	**lb/hr**	84.96	84.31	80.46
Ave. Steam Production	**klb/hr**	122.88	124.11	126.37
NOx/Steam ratio	**lb/klb**	0.691	0.679	0.637

Determine Baseline Throughputs:

Baseline throughput is the lesser of actual throughput or permitted throughput during the baseline period. Since none of the CO Boilers has a permit condition that limits throughput, the actual throughput is used. Average NOx emissions and throughput rates are summarized for the baselines in Table 2 above.

Determine Baseline Emissions:

From Table 2, the average hourly NOx emission rates over the respective baseline periods are:

CO Boiler 1 84.96 lb/hr
CO Boiler 2 84.31 lb/hr
CO Boiler 3 80.46 lb/hr

Baseline emissions are calculated by multiplying the hourly NOx emission rate by 8760 hr/year.

CO Boiler 1 (84.96 lb/hr) (8760 hr/yr) / (2000 lb/ton) = 372.1 tons/yr
CO Boiler 2 (84.31 lb/hr) (8760 hr/yr) / (2000 lb/ton) = 369.3 tons/yr
CO Boiler 3 (80.46 lb/hr) (8760 hr/yr) / (2000 lb/ton) = 352.4 tons/yr

These are the baseline emissions used for all previous IERC banking applications. However, these emissions must be reduced for this banking application, as discussed below*.*

Determine the Baseline-Adjusted Emissions (A):
The District cannot approve IERCs for an emission reduction that is required by a District rule, RACT, BARCT, etc. during a given credit generation period. To prevent this, the baseline emission rate must be adjusted (reduced) to reflect any rule or provision that is in effect during the credit generation period. Since requirements may change over time, it is possible to have different baseline adjusted emission rates for different credit generation periods.

Reg. 9-10-304 became effective on July 1, 2002. This Section limits NOx from CO Boilers to 150 ppm (at 3% O_2). This limit was in effect during each of the CGPs in this application. Therefore, we must adjust the baseline emission rate to account for the 150 ppm NOx standard.

To make the adjustment, the original CO Boiler baseline data was reviewed. For any day during the 5-year period baseline period when the average NOx concentration was greater than 150 ppm, staff adjusted (reduced) the daily NOx emissions. This was done by multiplying the actual emissions (lb/hr) by the ratio of the NOx concentrations. For example, if the actual daily NOx concentration was 185 ppm and the daily NOx emissions were 90 lb/hr, the adjusted NOx emissions were calculated as follows:

Example NOx adjustment to 150 ppm: (150 ppm/185 ppm) (90 lb/hr) = 77.0 lb/hr

This calculation was performed for each day during the baseline period that has a concentration greater than 150 ppm. Table 3 summarizes the revised baseline data, after adjusting for 150 ppm.

Table 3 – Baseline Data Adjusted for 150 ppm NOx Standard

	Baseline Adjusted NOx Emissions (lb/hr average)					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**5-Yr Ave.**
COB 1	88.47	73.27	75.72	72.78	70.85	**76.22**
COB 2	86.79	76.69	74.75	64.62	77.21	**76.01**
COB 3	81.32	82.00	69.46	57.86	75.79	**73.29**
Average	***85.53***	***77.32***	***73.31***	***65.09***	***74.62***	

In addition to the NOx standard in Reg. 9-10, the CO Boilers are subject to a permit condition (ID# 12271, Part 85) limiting total emissions from all three boilers to 5452 lb/day, annual average. This condition limit was reduced from the previous limit of 6770 lb/day to account for the 150 ppm NOx standard for CO Boilers in Reg. 9-10-304, which became effective on 7/1/02. This new condition limit is equivalent to 75.72 lb/hr for each boiler [(5452 lb/day / 24 hr/day) / 3]. Because this permit condition limit has been reduced, we must also adjust the IERC Baseline data to account for this lower limit. This adjustment is made as follows. In Table 3, for any year in which the average emissions for all 3 boilers was greater than 75.72 lb/hr, staff substituted 75.72 lb/hr for each CO Boiler for that year. This is the case for Years 1 and 2. Table 4 contains the adjusted baseline data.

Table 4 – Baseline Data Adjusted for 150 ppm NOx AND 5452 lb/day NOx Limit

	Baseline Adjusted NOx Emissions (lb/hr average)					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**5-Yr Ave.**
COB 1	75.72	75.72	75.72	72.78	70.85	**74.16**
COB 2	75.72	75.72	74.75	64.62	77.21	**73.60**
COB 3	75.72	75.72	69.46	57.86	75.79	**70.91**
Average	**75.72**	**75.72**	***73.31***	***65.09***	***74.62***	

Using the 5-Yr average emission rates from Table 4, the baseline-adjusted emissions for each CO Boiler are:

A (COB 1) (74.16 lb/hr) (8760 hr/yr) / (2000 lb/ton) = **324.8 tons NOx/yr**
A (COB 2) (73.60 lb/hr) (8760 hr/yr) / (2000 lb/ton) = **322.4 tons NOx/yr**
A (COB 3) (70.91 lb/hr) (8760 hr/yr) / (2000 lb/ton) = **310.6 tons NOx/yr**

Note that the above calculation of baseline-adjusted emissions is identical to that used in the previous application number 10368.

Determine the Actual Emissions (B) During the Credit Generation Period:
Actual emissions during each CGP are determined by multiplying the hourly average NOx emissions for the particular CGP by the duration of that CGP. The duration of the two credit generation periods in this application are 91 days and 365 days. Average NOx emission rates during each CGP were provided by Shell. Staff compared this data with Shell's monthly reports required by the Clean Fuels Project permit conditions. The emissions in this application are consistent with the data previously submitted by Shell. Tables 5 and 6 summarize the CO Boiler data for the credit generations periods covered by this application.

Table 5 - CO Boiler Data: (4/1/04 – 6/30/04)

	CGP #	NOx Emissions lb/hr	Steam Production klb/hr	Em. rate (NOx/steam) lb/klb
CO Boiler 1	7	60.9	116.0	0.525
CO Boiler 2	7	56.7	114.7	0.494
CO Boiler 3	8	57.3	102.2	0.561

Table 6 - CO Boiler Data: (7/1/04 – 6/30/05)

	CGP #	NOx Emissions lb/hr	Steam Production klb/hr	Em. rate (NOx/steam) lb/klb
CO Boiler 1	8	52.3	113.7	0.460
CO Boiler 2	8	50.2	115.6	0.434
CO Boiler 3	9	49.4	126.4	0.391

Actual emissions (B_x where *x* represents the CGP number) are:

4/1/04 – 6/30/04
B_7 (COB 1) = (60.9 lb/hr) (24 hr/day) (91 days) / (2000 lb/ton) = **66.5 tons of NOx**
B_7 (COB 2) = (56.7 lb/hr) (24 hr/day) (91 days) / (2000 lb/ton) = **61.9 tons of NOx**
B_8 (COB 3) = (57.3 lb/hr) (24 hr/day) (91 days) / (2000 lb/ton) = **62.6 tons of NOx**

7/1/04 – 6/30/05
B_8 (COB 1) = (52.3 lb/hr) (24 hr/day) (365 days) / (2000 lb/ton) = **229.1 tons of NOx**
B_8 (COB 2) = (50.2 lb/hr) (24 hr/day) (365 days) / (2000 lb/ton) = **219.9 tons of NOx**
B_9 (COB 3) = (49.4 lb/hr) (24 hr/day) (365 days) / (2000 lb/ton) = **216.4 tons of NOx**

Determine Credit Generation Period Non-Curtailment Emissions (C):
The non-curtailment emissions (C_x where x represents the CGP number) are calculated by multiplying the baseline throughput (steam production rate) by the emission rate (lb NOx / klb steam) for that CGP. Baseline throughputs are in Table 2, and CGP emission rates are in Table 5 and 6.

4/1/04 – 6/30/04 (91 days = 2184 hrs)
C_7 (COB 1) =
(122.88 klb steam/hr)(0.525 lb NOx/klb steam)(2184 hr) / (2000 lb/ton) **= 70.4 tons of NOx**

C_7 (COB 2) =
(124.11 klb steam/hr)(0.494 lb NOx/klb steam)(2184 hr) / (2000 lb/ton) **= 67.0 tons of NOx**

C_8 (COB 3) =
(126.37 klb steam/hr)(0.561 lb NOx/klb steam)(2184 hr) / (2000 lb/ton) **= 77.4 tons of NOx**

7/1/04 – 6/30/05 (365 days = 8760 hrs)
C_8 (COB 1) =
(122.88 klb steam/hr)(0.460 lb NOx/klb steam)(8760 hr) / (2000 lb/ton) **= 247.6 tons of NOx**

C_8 (COB 2) =
(124.11 klb steam/hr)(0.434 lb NOx/klb steam)(8760 hr) / (2000 lb/ton) **= 235.9 tons of NOx**

C_9 (COB 3) =
(126.37 klb steam/hr)(0.391 lb NOx/klb steam)(8760 hr) / (2000 lb/ton) **= 216.4 tons of NOx**

Calculate IERCs for the Credit Generation Period:
For a given source and credit generation period, IERCs are calculated by subtracting the greater of either the actual emissions (B) or the non-curtailment emissions (C) from the baseline-adjusted emissions (A). For the period 4/1/04 – 6/30/04, the baseline-adjusted emissions are prorated for a partial year (91/365).

4/1/04 – 6/30/04
COB 1 (CGP_7): **IERCs** = A_{COB1} (91/365) – C_7 = 81.0 tons – 70.4 tons = **10.6 tons of NOx**

COB 2 (CGP_7): **IERCs** = A_{COB2} (91/365) – C_7 = 80.4 tons – 67.0 tons = **13.4 tons of NOx**

COB 3 (CGP_8): **IERCs** = A_{COB3} (91/365) – C_8 = 77.4 tons – 77.4 tons = **0.0 tons of NOx**

7/1/04 – 6/30/05
COB 1 (CGP_8): **IERCs** = A_{COB1} – C_8 = 324.8 tons – 247.6 tons = **77.2 tons NOx**

COB 2 (CGP_8): **IERCs** = A_{COB2} – C_8 = 322.4 tons – 235.9 tons = **86.5 tons NOx**

COB 3 (CGP_9): **IERCs** = A_{COB3} – C_9 = 310.6 tons – 216.4 tons = **94.2 tons NOx**

IERC Banking Certificate
IERCs are valid for 5 years following the end of the credit generation period. In this banking application there are two time periods during which credit is generated. The IERCs generated in a given time period will be combined into a single IERC Banking Certificate.

IERC Banking Certificate #8-K (effective 7/1/04, expires 6/30/09)
24.0 Tons of NOx

IERC Banking Certificate #8-L (effective 7/1/05, expires 6/30/10)
257.9 Tons of NOx

STATEMENT OF COMPLIANCE

For an emission reduction to be banked as an IERC, the reduction must be real, permanent, quantifiable, enforceable and surplus (Section 2-1-301.2).

Real: The emission reductions evaluated in this application are real. There was an actual decrease in emissions to the atmosphere, as is evident from continuous emission monitoring (CEM) data.

Permanent: As defined in Section 2-9-213, permanent means that the emission reduction exists for the duration of the credit generation period (CGP). Since the CGP in this application has already ended, the emission reductions have already occurred, and therefore, are permanent.

Quantifiable: These emission reductions are quantifiable. The emission calculations were performed using NOx CEM and emission data, and steam production data.

Enforceable: As defined in Section 2-9-209, enforceable means that there is credible evidence during the credit generation periods to verify compliance with Regulation 2, Rule 9. The evaluation of this banking application is based on actual steam production data and NOx CEM and emission data.

Surplus: As defined in Section 2-9-218, surplus means that the emission reductions are not required by Reasonably Available Control Technology (RACT), Best Available Retrofit Control Technology (BARCT), or any other rule in effect during the credit generation period. In addition, emissions reductions must exceed any reduction required by the most recent Clean Air Plan or Air Quality Management Plan.

The District is not aware of any EPA guidance on RACT for CO Boilers. In the absence of such guidance, the District considers the 150 ppm NOx limit in Regulation 9, Rule 10, Section 304 to constitute RACT/BARCT for CO Boilers during these credit generation periods. Emissions during the baseline period the CO Boilers were reduced to reflect this 150 ppm limit.

The District's most recent plan is the 2005 Ozone Strategy. This plan contains an emission inventory for the year 2002, and projected emission inventories for subsequent years broken out by source category. To determine whether or not the IERCs requested by Shell are surplus to the OAP, staff compared the 2004 and 2005 emission inventories with actual emissions, ERC usage, and IERC usage in 2004 and 2005. This was done for all facilities that have generated or used IERCs to date. The 2004 and 2005 emission inventories exceeded the sum of actual emissions plus ERC and IERC usage. Therefore, the IERCs requested in this application are surplus.

PUBLIC COMMENT

The amount of IERCs exceeds 40 tons for one of the credit generation periods in this application. Therefore, this application is subject to the public comment provisions of Section 2-9-405. Before approving this banking application, the District must publish a notification of our preliminary decision to approve the IERCs. Following publication, there will be a 30-day public comment period, during which the District will accept written comments.

CEQA

The District will issue a Notice of Exemption for this application. Pursuant to Regulation 2-1-312.10, review of this application to bank emission reductions pursuant to Regulation 2, Rule 9 is exempt from CEQA review because it can been seen with clarity that review and approval of such applications have no potential for causing a significant environmental impact.

RECOMENDATION

Staff recommends the District issue a Notice of Exemption and a public notice for our preliminary decision to approve the following IERCs for emission reductions that occurred at Shell.

IERC Banking Certificate #8-K 24.0 Tons of Nitrogen Oxides

Source #	Baseline Period	Credit Generation Period
S-1507 CO Boiler #1	6/8/94 – 6/7/99	4/1/04 – 6/30/04
S-1509 CO Boiler #2	4/29/94 – 4/28/99	4/1/04 – 6/30/04
S-1512 CO Boiler #3	11/7/93 – 11/6/98	4/1/04 – 6/30/04

Effective Date: July 1, 2004
Expiration Date: June 30, 2009

IERC Banking Certificate #8-L 257.9 Tons of Nitrogen Oxides

Source #	Baseline Period	Credit Generation Period
S-1507 CO Boiler #1	6/8/94 – 6/7/99	7/1/04 – 6/30/05
S-1509 CO Boiler #2	4/29/94 – 4/28/99	7/1/04 – 6/30/05
S-1512 CO Boiler #3	11/7/93 – 11/6/98	7/1/04 – 6/30/05

Effective Date: July 1, 2005
Expiration Date: June 30, 2010

By:_____
Supervising Air Quality Engineer
Date: August 23, 2006